Report of Harmful Interference From a Broadband Over Power Line Trial or Deployment

Name of complainant: ROONEY W. ROSENBARGER

Call sign (if applicable): KI6IFH

Station location: MOBILE

Mailing address (if different): 1032 ZAVERKY RD

City, State, Zip: COTTONWOOD AZ. 86326

Telephone: 928-649-1866 Email: KI6FHRODO@COMMSPEED.NET

Description of Interference: CONTINUOUS CARRIER WITH DATA BURST

Description of Description of your station

MOBILE INSTALLED IN CHEVY PICKUP

Receiver(s) affected: ICOM 706 MIIG

Antenna type: HUSTLER HF MOBILE ANTENNAS

Antenna location: MOBILE IN COTTONWOOD AZ.

Distance of antenna from own house (feet):

0

Distance of antenna from neighboring houses (feet):

100'

Distance of antenna from power distribution line or equipment (feet): 250'

Log of interference:

Date	Time	Frequency	Receive Mode	Interfering signal strength	Description
6-17-04	9:00 AM	29.100 THRU 6H 30.000	USB	S9+20DB	CONTINUOUS CARRIER WITH DATA BURSTS
"	"	18.100 — 18.500	USB	S 7	"
"		13.000 — 15.000	USB	S 8+	"
"		7.000 — 7.300	LSB	S 8	"
"		3.700 — 26.000 — 28.000	USB AM	S 8 / S 9+	"

August 9, 2004

Mr. David Shpigler
Electric Broadband
North Mill Street
Nyack, NY 10960

Dear Mr. Shpigler,

Broadband over Power Lines (BPL) interfering signals have been here in Cottonwood since May of this year. We have seen no changes in the interfering signals from May through August 2, 2004. Three months is more than enough time to fix the interference.

It is time to face the facts that BPL radiates interference from power lines! It is time to shut down BPL because of the unacceptable interference it emits.

Sincerely,

Norman Wandiver

Norman W. Vandiver, N7VF
1862 Arena Del Loma
Camp Verde, AZ 86322
928-567-9881
vandivers@kachina.net

ENCL: Report of Harmful Interference from BPL dated 8-9-04

CC: FCC-Anh Wride, Alan Stillwell, Riley Hollingworth, James Burtle,
Ed Hare of ARRL.

- 8-9-04 -

Report of Harmful Interference From a Broadband Over Power Line Trial or Deployment

Name of complainant: Norman W Vandiver

Call sign (if applicable): N7VF

Station location: Mobile in Cottonwood AZ

Mailing address (if different): 1862 Arena Del Loma

City, State, Zip: Camp Verde AZ 86322

Telephone: 928-567-9881 Email: vandivers@kachina.net

Description of Interference: Carriers with modulation click spaced approx 1.6 KHZ

Description of station: Elecraft K-2 HF transciever Vehical Mounted for mobile operation

Receiver(s) affected: Elecraft-K2 Tunes Amature Frequencies 3-30 MHZ

Antenna type: Hustler 54" Vertical with resonators for each Ban

Antenna location: Left front Fender of 1987 Chev. Pick up

Distance of antenna from own house (feet): NA

Distance of antenna from neighboring houses (feet): NA

Distance of antenna from power-distribution line or equipment (feet): 300 Feet to One and one half miles dependant on direction of travel.

8-9-04

Log of Interference:

Date	Time	Frequency MHZ.	Receive Mode	Interfering Signal Strength	Description
8/2/04	2:PM	14.320	USB	55	Carrier with Modulation Clicks
		14.304	USB	55	
		14.292	USB	52	
8/2/04	2PM	3.983	LSB	57	Carrier With Modulation Click's
		3.989	LSB	59	
8/2/04	2PM	3.989	LSB	1/4 mile 55	Carrier With Modulation Click's
				1/2 mile 57	
				1 mile 55	

traveling east on HWY 760 away from the BPL site.

I could hardly believe my own eyes and ears. So come and see for your self. These signals are traveling on the Power lines!

es Burtle

1: Anh Wride
:: Thursday, September 02, 2004 2:58 PM
James Burtle; Alan Scrime; Alan Stillwell; Bruce Franca; Karen Rackley
ject: FW: BPL Interference complaint, new
Non-Public: For Internal Use Only ***
Original Message-----
n: Doyle Hardy [mailto:dghardy@charter.net]
: Thursday, September 02, 2004 2:36 PM
Anh Wride
ject: BPL Interference

ıe of complainant: __Doyle Hardy_____
sign (if applicable):____K5HTE_____
ion location:_____6521 Circleview Dr , Ft Worth Tx, 76180_____
ling address (if different):_____
r, State, Zip:_____Ft Worth TX, 76180_____
ephone:____817 -281-8670_____ Email:__dghardy@charter.net_____
scription of Interference:___I was in contact with _K8NDS who at the time was operating mobil station Cottonwood AZ. He was at Murphy'grill in Cottonwood . The interfence i from the local BPL test made my signal unreadable. When the BPL was off I had a signal of S7 and very dable._____
_____
_____
_____
scription of station:____My station is Kenwood TS-570 D, running 100 tts_____
_____
ceiver(s) affected:__ICOM 706 mark 2 G_____
ıtenna type:_____
ıtenna location:_____
stance of antenna from own house (feet): _____
stance of antenna from neighboring houses (feet): _____
stance of antenna from power distribution line or equipment (feet):_____
g of interference:

Date	Time	Frequency	Receive Mode	Interfering signal strength	Description
09/02/04	1800GMT	14225 MHZ	SSB	57 +	Was informed that BPL totally made my signal unreadable.

ırt 15 of the Federal Communications Commission's

es protect from harmful interference

's rules, Part 15 includes a definition of harmful interference. It can be found in §15.3
: "Harmful interference. Any emission, radiation or induction that endangers the functioning
a radio navigation service or of other safety services or seriously degrades, obstructs, or
eatedly interrupts a radiocommunication service operating in accordance with this chapter."

rules are very clear about the operation of Part 15 devices, too. §15.5 details general
ditions of operation, saying in part:

Operation of an intentional, unintentional, or incidental radiator is subject to the
ditions that no harmful interference is caused and that interference must be accepted that
be caused by the operation of an authorized radio station, by another intentional or
ntentional radiator, by industrial, scientific, and medical (ISM) equipment, or by an
idental radiator.

The operator of a radio frequency device shall be required to cease operating the device
n notification by an FCC representative that the device is causing harmful interference.
ration shall not resume until the condition causing the harmful interference has been
rected.

t 15 permits the operation of certain radio frequency devices without a license from the FCC
the need for frequency coordination (47 C.F.R. § 15.1). The technical standards contained in
t 15 ensure that unlicensed devices will not cause harmful interference to other users of
radio spectrum (47 C.F.R. § 15.5). Within the Part 15 Rules, intentional radiators (devices
t transmit a telecommunication signal) are permitted to operate under a set of limits. Part
of the FCC Rules and Regulations has established Radio Frequency emission limits to *provide
interference-free radio frequency spectrum*. Many electronic devices generate RF energy
idental to their intended function and are covered by these rules of
harmful interference.

James Burtle

From: James Burtle
Sent: Tuesday, September 21, 2004 4:15 PM
To: 'shpigler@electricbroadband.com'
Subject: FW: BPL Interference Reports


James Burtle FCC letter Sept 1...


BPL Interference Report Aug-Se...

Mr. Shpigler,

Here is the complaint that I received from Mr. Vandiver.

Jim Burtle

*** Non-Public: For Internal Use Only ***

-----Original Message-----
From: vandivers [mailto:vandivers@kachina.net]
Sent: Friday, September 17, 2004 1:38 PM
To: James Burtle
Subject: BPL Interference Reports

Dear Mr. Burtle,

Please find attached a copy of the hard copy letter and report I mailed to you.

Respectfully,

Norman W. Vandiver, N7VF
1862 Arena Del Loma
Camp Verde, AZ 86322
928-567-9881

September 15, 2004

Federal Communications Commission
Mr. James R. Burtle
Chief, Experimental Licensing Branch
Room 7-A267
445 – 12th Street S.W.
Washington, D.C. 20024

Dear Mr. Burtle,

Thank you for your response to my interference reports of June and August of this year. Electric Broadband (EBB) has not responded to those reports.

I have continued to spot-check the amateur bands at the Cottonwood BPL sites. Electric Broadband has been making changes but they do not eliminate the interference to the ham radio and CB bands. What they are doing is shifting from one segment of the HF spectrum to another, between the three sites.

I do have an unsigned copy of a report to you from Electric Broadband. However, this report is invalid and misleading. Please refer to the ARRL analysis for the technical specifications. How can EBB deny the issue of BPL interference? The claim to working with the ARRL is hollow because EBB has not worked with the local ham radio club, Verde Valley Amateur Radio Association. Other than phone calls of no substance, there has been no cooperation from EBB.

Were BPL to be in my neighborhood, within ¼ mile, my equipment would be neutralized and my license worthless. It would be unable to perform any type of emergency communications on the HF ham bands. BPL also eliminates mobile and portable operation for emergency communications. I know the importance of having emergency communications operable...I was in Anchorage, Alaska, in March of 1964 when they had the huge earthquake. After the major quake, I got my ham station up and on the air, spending the following days and nights relaying health and welfare messages to the lower 48. I KNOW what ham radio is for!

Why aren't BPL and the FCC giving us guidelines about how to operate under their interfering conditions? If they're happy with these conditions, doesn't it seem reasonable they would tell us how to co-exist with the interference? How has it become possible for BPL promoters to steal the HF spectrum with amateur radio operators who are left to discover what is really happening? And why are the trial BPL tests snuck in and hidden, both technically and physically? If BPL is deployed, will the FCC perform their responsibilities as stated in both statute and law? I fear the worst because of the manner in which the FCC is handling BPL

(continued page two)

I find it interesting our radio club cannot get a response from our own Senator John McCain regarding our concerns with this BPL interference issue. We have written Senator McCain, offering him to come to Cottonwood to experience the actual interference, but to no avail.

In conclusion, I would like an honest, straightforward reply to my questions raised in this letter. I thank you in advance for your real-life response.

Respectfully,

Norman W. Vandiver, N7VF
1862 Arena Del Loma
Camp Verde, AZ 86322
928-567-9881

cc: Anh Wride, FCC, Alan R. Stillwell, FCC, Riley Hollingsworth, FCC, William J. Post, Arizona Public Service, Senator John McCain, Verde Valley Amateur Radio Association

Encl: Interference Measurement Reports for Cottonwood, AZ, BPL sites, Aug-Sept 2004

HARMFUL INTERFERENCE REPORT FROM BPL TRIAL

Cottonwood, AZ

Date	Time	Frequency MHZ	Receive Mode	Interfering Signal Strength	Description
LOCATION: Birch Street Apartments, on the street in front of the buildings. Cottonwood, AZ.					
8/29/2004	4:23 PM	14.165	USB	S9 + 30 db	Multiple carriers w/galloping, clicking modulation.
8/29/2004	4:23 PM	14.168	USB	S9 + 30 db	Multiple carriers w/galloping, clicking modulation.
9/8/2004	12:45 PM	26.988	USB	S0 + 20 db	Multiple carriers w/galloping, clicking modulation.
9/8/2004	12:45 PM	28.866 to 29.434	USB	S9 + 20 db Modulations to 35 db	Multiple carriers w/galloping, clicking modulation.
9/8/2004	1:15 PM	14.305	USB	S9 + 20 db	Sounds like a harsh telephone dial tone.
Location: Birch Street Apartments, across the street. Cottonwood, AZ.					
9/10/2004	10:00 AM	18.165	USB	S9	Multiple carriers with galloping, clicking modulation.
9/14/2004	9:04 AM	24.99	USB	S9 + 10 db	Multiple carriers with galloping, clicking modulation.
9/14/2004	9:04 AM	24.89	USB	S9 + 10 db	Multiple carriers with galloping, clicking modulation.
Location: End of Birch Street, Cottonwood, AZ.					
9/14/2004	10:00 AM	28.713	USB	S9 + 20 db	Galloping click on low-level carriers.
9/14/2004	10:00 AM	28.685	USB	S9 + 20 db	Galloping click on low-level carriers.
9/14/2004	10:00 AM	28.336	USB	S9 + 20 db	Galloping click on low-level carriers.
9/14/2004	10:00 AM	28.267	USB	S9 + 15 db	Galloping click on low-level carriers.
9/14/2004	10:00 AM	28.248	USB	S9 + 15 db	Galloping click on low-level carriers.
9/14/2004	10:30 AM	26.965 to 27.405	USB	S7	Galloping click on low-level carriers.
Location: Sawmill Cove on Cottonwood Street, Cottonwood, AZ.					
9/10/2004	10:30 AM	27.670 to 24.890	USB	S9	Multiple carriers with galloping, clicking modulation.
Location: Sawmill Cove, site of injection on Cottonwood Street, Cottonwood, AZ.					
9/14/2004	7:24 AM	28.423	USB	S9 + 10 db	Multiple carriers with galloping, clicking modulation.
9/14/2004	7:24 AM	28.862	USB	S9 + 10 db	Multiple carriers with galloping, clicking modulation.
9/14/2004	7:24 AM	29.541	USB	S1	
9/14/2004	7:24 AM	24.898	USB	S5	

Station Equipment:

Elecraft K-2 Transceiver

Vehicle mounted for mobile operation.

3-30 MHZ frequency.

Mode: single sideband

IF band width: 2.2 KHZ filter

Antenna: Hustler 54" vertical with resonators.

Antenna is mounted on the left front fender of a 1987 Chevrolet pickup truck.

8' of RG8 coax connect the antenna and transceiver.

Norman W. Vandiver, N7VF
vandivers@kachina.net

928-567-9881

1862 Arena Del Loma
Camp Verde, AZ 86322

HARMFUL INTERFERENCE REPORT FROM BPL TRIAL

Cottonwood, AZ

Date	Time	Frequency MHZ	Receive Mode	Interfering Signal Strength	Description
9/14/2004	11:00 AM	28.726	USB	S8	Galloping, clicking modulation.
"	"	28.715	"	S7	"
"	"	28.706	"	S7	"
"	"	28.698	"	S6	"
"	"	28.686	"	S6	"
"	"	28.675	"	S6	"
"	"	28.668	"	S8	"
"	"	28.658	"	S7	"
"	"	28.649	"	S7	"
"	"	28.638	"	S7	"
"	"	28.628	"	S7	"
"	"	28.618	"	S7	"
"	"	28.608	"	S7	"
"	"	28.598	"	S7	"
"	"	28.588	"	S8	"
"	"	28.578	"	S8	"
"	"	28.568	"	S7	"
"	"	28.558	"	S7	"
"	"	28.548	"	S8	"
"	"	28.538	"	S8	"
"	"	28.532	"	S8	"
"	"	28.52	"	S8	"
"	"	28.512	"	S7	"
"	"	28.502	"	S7	"
"	"	28.492	"	S8	"
"	"	28.48	"	S8	"
"	"	28.472	"	S8	"
"	"	28.462	"	S8	"
"	"	28.452	"	S8	"
"	"	28.442	"	S8	"
"	"	28.432	"	S8	"
"	"	28.422	"	S8	"
"	12:30 PM	28.09	"	S8	"

Station Equipment:
Elecraft K-2 Transceiver
Vehicle mounted for mobile operation.
3-30 MHZ frequency.
Mode: single sideband
IF band width: 2.2 KHZ filter
Antenna: Hustler 54" vertical with resonators.
Antenna is mounted on the left front fender of a 1987 Chevrolet pickup truck.
8' of RG8 coax connect the antenna and transceiver.

Norman W. Vandiver, N7VF
vandivers@kachina.net
928-567-9881
1862 Arena Del Loma
Camp Verde, AZ 86322

Verde Valley Amateur Radio Association BPL Committee Report on the Effectiveness of BPL Notching as of October 2, 2004, at the Cottonwood, Arizona Trial Test Sites

To: Sheryl Wilkerson, FCC October 5, 2004

This Notching report is in re: Experimental Station WB9XVP; File No. 0136-EX-2004 at Cottonwood (Yavapai County) Arizona; Broadband Over Power Line System; Request for immediate cessation of Operation and Revocation of Special Temporary Authorization

From the time of the first harmful interference reports from individuals in mid-June and the VVARA filing of initial harmful interference on July 31, 2004, actual adjustments to the system by Electric broadband, LLC did not begin until mid August. Initial notching left quite a bit of interference. (See VVARA filing dated September 11, 2004 to Jim Burtle). Subsequent notching was marginally more effective. However, a problem continues to exist on the following Amateur bands; 17 meters, 15 meters, 10 meters and 20 meters. See appendix A for October 2, 2004 measurements.

These BPL signal readings were measured from an HF mobile station. In a fixed station setting the interference readings from a larger more efficient antenna system will be much higher on the affected bands. Due to the geographically small size of the trial area, no fixed amateur station is currently located near the BPL equipment. Certainly, this will not be the case if BPL is deployed throughout the community.

As evidenced in these most recent measurements, mitigation has not included MARS frequencies, shortwave broadcasts, portions of low VHF and Citizens bands.

Technical Discussion

BPL distributes data by imposing modulation on RF signals that are amplified to appropriate levels and sent over power lines. If unmodulated signals are transmitted over power lines, the amount of radiation in a select

portion of the electromagnetic spectrum could be easily reduced by simply excluding RF signals whose fundamental frequency are outside the selected band. It appears that the solution pursued by Electric Broadband is to eliminate the transmission of data within the protected (notched) band. We have no assurance that the operator of this or other similar systems will not employ other frequencies as their needs might dictate which will result in new interference. Absent clear boundaries set down by the Commission, we will constantly be in the form of a ***shell game*** which has already existed here when EB says "We're off" and we find they are "on". The misconception appears to be that by simply not selecting a frequency whose fundamental frequency is in a specific band of frequencies that there is no energy being radiated by the system in the band. There are two principal effects that will create RF energy in a supposed rejected band using notching:

1. Modulation bandwidth of modulated carrier signals and
2. Nonlinearities in amplifier gain blocks causing harmonic content.

Any signal that is modulated with data will, theoretically, be spread over a very wide band including the entire BPL band. The amount of spreading of a signal by data modulation is predominantly influenced by the modulation index that is a design property of the BPL modem. The slopes of the modulation sideband skirts determine how wide a notch must be to reduce the energy in the affected receiver (ham, CB, military user, etc). The level of suppression (or notch) determines the level of in-band spurious signals and must be set to levels where no harmful interference is created. To assure that the harmful interference is not created in a band that is being "notched", measurements are needed to confirm that the modulation sidebands from signals below and above the notched frequency band are being suppressed with an adequate guard band and that the depth of the null is low enough to eliminate harmful interference.

From data published in recent reports by Electric Broadband, LLC, it is clear that notching is being implemented. There does appear to be a noticeable reduction in the radiated power in some bands where notching is attempted. Electric fields in notched bands are on the order of 20 db below the levels above and below the notched bands.

The question remains on whether there is sufficient reduction in the radiated energy in a "notched" band to eliminate interference. What is difficult to determine in the tables produced in the September 16, 2004 report is whether the field intensity levels are measured accurately enough to determine if

notching alone can eliminate interference in the notched bands. The local amateurs who used their mobile stations to characterize the levels of radiation are convinced that even with notching certain bands are unusable because of BPL interference. For example, the 17-meter band (~18.1 MHz) is rendered unusable by levels of radiation from the power lines carrying conditioned (notched) BPL signals.

Notching alone can not assure that signals are not emitted on unintended frequencies. Because the BPL system relies upon the regeneration and retransmission of signals at periodic intervals within the network, this means that amplification is needed. A reality of life is that amplifiers are never perfect, one byproduct of amplification is called intermodulation. Intermodulation (intermod) allows energy to be regenerated on frequencies that were not initially transmitted. These signals can be the source in interference. This is a function of the novel properties of each amplifying stage (repeater/retransmitter) and can vary widely. A second issue is that in some cases 'notching' is realized through the use of Digital Signal Processing (DSP). These techniques do not eliminate signals they merely attenuate (reduce) them so DSP notching does not fully equate to elimination of energy.

The proponents of the Cottonwood BPL test have spent hundreds of hours adjusting and readjusting a very small universe of BPL equipment, including bringing in the manufacturers' representatives from abroad practically this amount of attention can not be applied to a large system on a regular basis. The unfortunate recipient of interference must be both technically adroit and articulate if they are to even raise the question to the operators of the system. We have been trying to gain genuine relief since June 17, 2004, and still have received only a modest remedy and little if any exhortation to this end has been forthcoming from the Commission. In a wholesale deployment, the average ham or spectrum user will be totally ill-equipped to articulate the slight being worked upon them.

Summary

Some say that notching by selecting carrier frequencies (sometimes referred to as the DSP solution) will solve the harmful interference problem. The reality is that the problem is solved only when the levels of radiation in the affected bands (ham radio, CB, military, etc) drop below acceptable levels as determined by testing. This may be very difficult to prove in the test cell in Cottonwood, AZ. So far, testing by experts has failed to capture the true levels of field intensities in the notched bands that correlate with an

independent assessment. This will probably be incredibly difficult for APS (Arizona Public Service) to maintain if BPL is deployed on a large scale. APS will be inundated with requests to fix problems throughout their network if many tweaks are required to fine tune a system to prevent unacceptable interference levels.

Notching will not be sufficiently effective, by itself, overcome the effects of harmful interference in the HF bands. Even a combination of notching and radiated power limitation will likely be insufficient to overcome the effects of harmful interference.

The additional concern that should be expressed is that there remains no assurance that even if successful 'notching' is implemented today that it will stay in place. By accident or intention the operator of the BPL system perhaps under pressure to increase speed, or service more customers, will have at their disposal the ability to simply re-occupy these portions of the spectrum as they desire. That means that the licensed users of the spectrum must be ever vigilant. In the case of the NTIA they have requested that portions of the spectrum simply be protected ***en banc*** and one might assume that the Commission will so stipulate or otherwise condition the licenses of users who might occupy those segments if the NTIA's request is granted.

Many other users of spectrum in closed systems such as cable TV, are required to annually assert to the Commission their frequency as well as power utilization within those closed conductors, it seems only equitable that a radiating user should be required to account for their activities in a similar fashion. Unless clear rules that are easy to test are in place at the outset and the Commission is prepared to aggressively enforce these rules, the HF spectrum users will experience a major degradation in the use of their licensed bands and the Commission will be the loser in endless hours of wrangling over similar issues for years into the future.

Respectively submitted,

Robert Shipton, K8EQC
Vice President
Verde Valley Amateur Radio Association
BPL Committee Chairman
Cottonwood, Arizona

APPENDIX A

BPL Signal Strength Readings
Recorded October 2, 2004 from 9:50 AM through 1:00PM

Radio and antenna information:

Icom 706 Mark 11 G
Preamp off
Selectivity: **3.00 khz SSB, CW- (2.4 khz SSB filter)**
8.00 khz AM
8.00 khz FMN
12.00 khz FM

Hustler antenna- 54 inch mast, bumper mounted at right rear corner 2003 Chevrolet pickup. Using Hustler 400 watt resonators for each band with the exception of 160 meter band where 80 meter and 40 meter resonator used for that band.

Coax- is 18 feet RG 58. Rated loss 4.5 DB at 100 feet. Velocity factor- 66%

Signal readings were taken by the following at the 3 BPL sites in Cottonwood, AZ at a distance of approximately 30 feet from the power lines.

Mike Kinney- KU7W
1652 E. Sierra Drive
Cottonwood, AZ. 86326

Norm Vandiver- N7VF
1862 Arena Del Loma
Camp Verde, AZ. 86322

nes Burtle

Forwarded to operator 10/7/04

m: robert shipton [xytek@commspeed.net]
nt: Wednesday, October 06, 2004 3:53 PM
: Sheryl Wilkerson
: Anh Wride; Alan Stillwell; Riley Hollingsworth; James Burtle
bject: Verde valley Amateur Radio Association , Cottonwood, AZ BPL Notching summary.

Sheryl

re is the mitigation and notching summary from the VVARA, Cottonwood, AZ as of 10-02-04

ncerely,

bert Shipton, K8EQC
e President, Verde Valley Amateur Radio Association
PL Committee Chairman
ttonwood, AZ

Sawmill Cove Area

Frequency	S Readings/ Comments
1.800- 2.000 mhz-	**No BPL signals detected**
3.500- 4.000 mhz-	**No BPL signals detected**
6.000- 6.900 mhz-	BPL signals detected/ 6.617 mhz- S3 SSB
7.000- 7.300 mhz-	**No BPL signals detected**
7.540 mhz-	BPL signals detected- S5- SSB, S6- AM Started at 7.400 mhz.
10.000- 10.150 mhz	**No BPL signals detected**
10.600 mhz-	BPL signals real faint on SSB
11.000 mhz-	BPL signals real faint on SSB
12.000 mhz-	BPL signals real faint on SSB
13.000- 13.900 mhz-	BPL signals real faint on SSB
14.000- 14.350 mhz-	**No BPL signals detected**
18.068- 18.168 mhz-	**No BPL signals detected**
18.350- 19.000 mhz-	BPL signals detected/ 18.350 mhz- S9 SSB
19.000 mhz-	BPL signals S9 SSB, S9+20 DB- AM
20.000 mhz-	BPL signals S7 SSB, S9- AM
21.000 mhz-	**BPL signals detected S5 SSB, S7 AM**
21.100 mhz-	**S4 SSB, S7 AM**
21.200 mhz-	**S3 SSB, S6 AM**
21.300 mhz-	**S3 SSB, S7 AM**
21.400 mhz-	**S4 SSB, S7 AM**
21.450 mhz-	**S5 SSB, S7 AM**
21.500 mhz-	BPL signals detected S5 SSB
21.614 mhz-	S9+20 DB
22.000 mhz-	S9+10 DB
23.000 mhz-	No BPL signal detected
24.890- 24.990 mhz-	**No BPL signals detected**
26.000- 27.923 mhz-	BPL signals detected S7 SSB on and off intermittent.

28.000- 28.700 mhz-	**BPL signals detected on and off intermittent.**
29.540 mhz-	**S5 SSB intermittent**
29.494 mhz-	**S4 SSB intermittent**
29.700 mhz-	**S4 SSB intermittent**
34.000 mhz-	BPL signals detected faintly
34.190- 35.000 mhz-	S3 SSB, S7 AM
35.543- 36.000 mhz-	S5 SSB, S7 AM
36.016- 37.000 mhz-	S7 SSB, S8 AM
38.600 mhz-	BPL signal drop-off
42.046- 42.700 mhz-	BPL signals faint

American Heritage Academy

1.800- 2.000 mhz-	**No BPL signal detected**
2.538 mhz-	Faint BPL signal detected
3.000 mhz-	S6 SSB, S7 AM
3.424 mhz-	BPL signal drop-off to faint
3.500- 4.000 mhz-	**Little bit BPL signal detected at 3.500 mhz but rest of band clear.**
4.100 5.000 mhz-	BPL signal detected S5 SSB, S6 AM
5.000 mhz-	BPL signal drops off
6.476 mhz-	BPL signal starts up again
6.911 mhz-	BPL signal ends again
7.000- 7.300 mhz-	**No BPL signals detected**
7.400- 7.700 mhz-	BPL signals detected faintly
7.700- 9.000 mhz-	BPL signals detected faintly
9.000- 10.000 mhz-	BPL signals detected faintly
10.000- 10.150 mhz-	No BPL signals detected
10.240- 10.600 mhz-	BPL signals detected faintly
10.600- 11.000 mhz-	S5 SSB, S7 AM
11.000- 12.000 mhz-	S5 SSB, S7 AM
12.000- 13.000 mhz-	S7 SSB, S7 AM
13.000 mhz-	S5 SSB, S7 AM
13.500 mhz-	S5 SSB, S7 AM
13.950 mhz-	BPL signal drops off
14.000 mhz-	**BPL signals detected faint**
14.102 mhz-	**BPL signals drop off**
14.102- 14.350 mhz-	**No BPL signals detected**
16.000 mhz-	BPL signals detected faintly
16.300 mhz-	S5 SSB
16.315 mhz-	S7 SSB
17.000 mhz-	S7 SSB
18.000 mhz-	S7 SSB, S9 AM
18.068 mhz-	**S5 SSB, S6 AM**
18.100 mhz-	**S2 SSB, S6 AM**
18.168 mhz-	**S2 SSB, S6 AM**

18.271 mhz-	S9+20DB SSB, S9+20DB AM
18.900 mhz-	BPL signal drops off
19.000- 20.000 mhz-	BPL signal detected faintly
20.000- 20.900 mhz-	BPL signal detected faintly
21.000- 21.450 mhz-	**No BPL signal detected**
21.600- 22.000 mhz-	BPL signal detected faintly
22.800 mhz-	S7 SSB
23.000 mhz-	S5 SSB
24.000 mhz-	S6 SSB
24.890- 24.990 mhz-	**BPL signal detected faintly**
26.000 mhz-	S-6 SSB, S9 AM
26.902 mhz-	S7 SSB, S9 AM
27.187 mhz-	S8 SSB, S9 AM
27.414 mhz-	S7 SSB, S9 AM
27.800 mhz-	S9 SSB, S9+20 DB AM
28.000 mhz-	**S4 SSB, S6 AM**
28.098 mhz-	**S1 SSB, S5 AM**
28.203 mhz-	**S0 SSB, S4 AM**
28.300 mhz-	**S0 SSB, S4 AM**
28.400 mhz-	**S0 SSB, S4 AM**
28.600 mhz-	**S0 SSB, S4 AM**
28.800 mhz-	**S0 SSB, S4 AM**
29.300 mhz-	**S0 SSB, S1 AM**
29.700 mhz-	**S0 SSB, S4 AM**
34.000 mhz-	BPL signal detected faintly
34.196 mhz-	S7 SSB, S8 AM
35.000 mhz-	S6 SSB, S8 AM
36.000 mhz-	S5 SSB, S6 AM
37.000 mhz-	S5 SSB, S4 AM
37.450 mhz-	S5 SSB, S6 AM
37.940 mhz-	S3 SSB, S6 AM
38.000 mhz-	BPL signal gone
50.000- 54.000 mhz-	**No BPL signals detected**

Birch Street Apartments

1.800- 2.000 mhz-	**No BPL signals detected**
2.500 mhz-	BPL signals detected faintly
3.022 mhz-	S4 SSB
3.184 mhz-	S3 SSB, S7 AM
3.301 mhz-	S4 SSB, S6 AM
3.421 mhz-	BPL signal drops off
3.500- 4.000 mhz-	**No BPL signals detected**
4.100- 4.600 mhz-	BPL signals detected faintly
6.400 mhz-	BPL signals detected faintly
6.500 mhz-	S7 SSB, S9 AM
6.960 mhz-	BPL signal drops off
7.000- 7.100 mhz-	**BPL signal detected faintly**
7.100- 7.300 mhz-	**No BPL signal detected**
7.340 mhz-	BPL signal starts
7.363 mhz-	S6 SSB, S8 AM
8.000 mhz-	BPL signal detected but faint
8.503 mhz-	S0 SSB, S5 AM
8.798 mhz-	S4 SSB, S6 AM
9.022 mhz-	BPL signal drops off to faint
9.950 mhz-	BPL signal drops off to nothing
10.000- 10.150 mhz-	**No BPL signal detected**
10.219 mhz-	BPL signal start faintly
10.501 mhz-	S1 SSB, S6 AM
10.635 mhz-	S9 SSB, S9+30 DB AM
10.681 mhz-	S9+10 DB SSB, S9+30 DB AM
11.000 mhz-	S9 SSB, S9+30DB AM
12.000 mhz-	S9+20 DB SSB, S9+40DB AM
12.500 mhz-	S9+20DB SSB, S9+40DB AM
13.000 mhz-	S9 SSB, S9+20DB AM
13.500 mhz-	S9+30DB SSB, S9+60DB AM
14.000 mhz-	**S7 SSB, S9 AM**
14.100 mhz-	**S6 SSB, S9 AM**
14.260 mhz-	**S6 SSB, S7 AM**
14.303 mhz-	**S4 SSB, S6 AM**
14.350 mhz-	**S4 SSB, S6 AM**

15.000 mhz-	S-1 SSB
15.015 mhz-	BPL signal drops off
16.240 mhz-	BPL signal starts
16.308 mhz-	S6 SSB, S7 AM
17.000 mhz-	S-1 SSB, S3 AM
17.395 mhz-	S0 SSB
17.615 mhz-	S4 SSB, S6 AM
17.967 mhz-	BPL signal drops off
18.068- 18.168 mhz-	**No BPL signals detected**
18.265 mhz-	BPL signals start
18.273 mhz-	S6 SSB, S8 AM
18.868 mhz-	BPL signal drops off
18.977 mhz-	BPL signal starts up again
19.000 mhz-	S1 SSB
20.000 mhz-	S0 SSB, S3 AM
20.900 mhz-	BPL signal drops off
21.000-21.450 mhz-	**No BPL signals detected**
21.595 mhz-	BPL signals detected and start
22.000 mhz-	S6 SSB
22.500 mhz-	S6 SSB
22.775 mhz-	S9+40DB SSB intermittent
23.507 mhz-	S9+40DB SSB intermittent
23.800 mhz-	S9+10DB SSB intermittent
24.000 mhz-	S9+20 DB SSB intermittent
24.500 mhz-	S9 SSB intermittent
24.890- 24.990 mhz-	**BPL signals detected faintly**
26.623 mhz-	BPL signals starts again
26.665 mhz-	S7 SSB, S9 AM
27.000 mhz-	S7 SSB, S9 AM
27.405 mhz-	S7 SSB, S8 AM
27.693 mhz-	S6 SSB, S7 AM
27.927 mhz-	BPL signals drop off
28.000- mhz-	**S3 SSB**
28.010 mhz-	**BPL signal gone**
28.010- 29.700 mhz-	**BPL signals not detected**
34.678 mhz-	BPL signals start Faint
36.000 mhz-	BPL signals detected but faint
38.000 mhz-	BPL signals detected but faint